

Very-early acute pro-nociceptive pain modulation predicts chronic pain in mTBI patients six-month post injury

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Background and Aims

Every year millions are involved in motor vehicle collisions (MVC). Many reach full recovery in 3-6 months post-injury, however up to 50% will suffer from chronic pain.

The lab assessment of endogenous pain inhibition is a 'new generation' tool to depict an individual's pain modulation mechanism. Individuals can be positioned on the clinical nociceptive spectrum where pro-nociceptive individuals express a higher pain phenotype, resultant in higher risk of pain chronification.

Study Aim - To identify the predictive value of inhibitory pain modulation for pain chronification among patients with mild traumatic brain injury (mTBI) tested at the very-early acute post-collision state.

Methods

Seventy-three post-MVC participants diagnosed with mTBI (age range 36.1 ± 11.4 , F=27) underwent psychophysical assessment within 72h after the MVC, and provided head and neck pain scores at 6 months post-accident.

The psychophysical assessment consisted of conditioned pain modulation (CPM) paradigm which measures the difference between pain scores to 30 brief contact heat test-stimuli (forearm) given as stand-alone, and then repeated concurrent with a conditioning-stimulus (immersion of the other hand in cold water).

Very short test-stimuli were used in order to detect corresponding event related potentials. CPM was considered efficient if test-pain rating reduced under the conditioning stimulus (negative CPM score). Chronic clinical pain score was the average of head and neck pain scores at 6 months. Patients were divided into pain group (≥ 20 on 0-100 NPS, n=35) and no pain group (n=38).

Results

An association was found between (i) CPM efficiency as assessed during the very-early acute post-MVC and (ii) chronic pain intensity:

- Baseline CPM efficiency (expressed in %) linearly correlated with chronic pain scores (Fig 1a). In line, patients that developed chronic pain had less-efficient CPM at baseline (Fig 1b)

Fig 1a. CPM correlates with clinical pain at 6 months post-MVC: Less efficient CPM predicts higher chronic pain

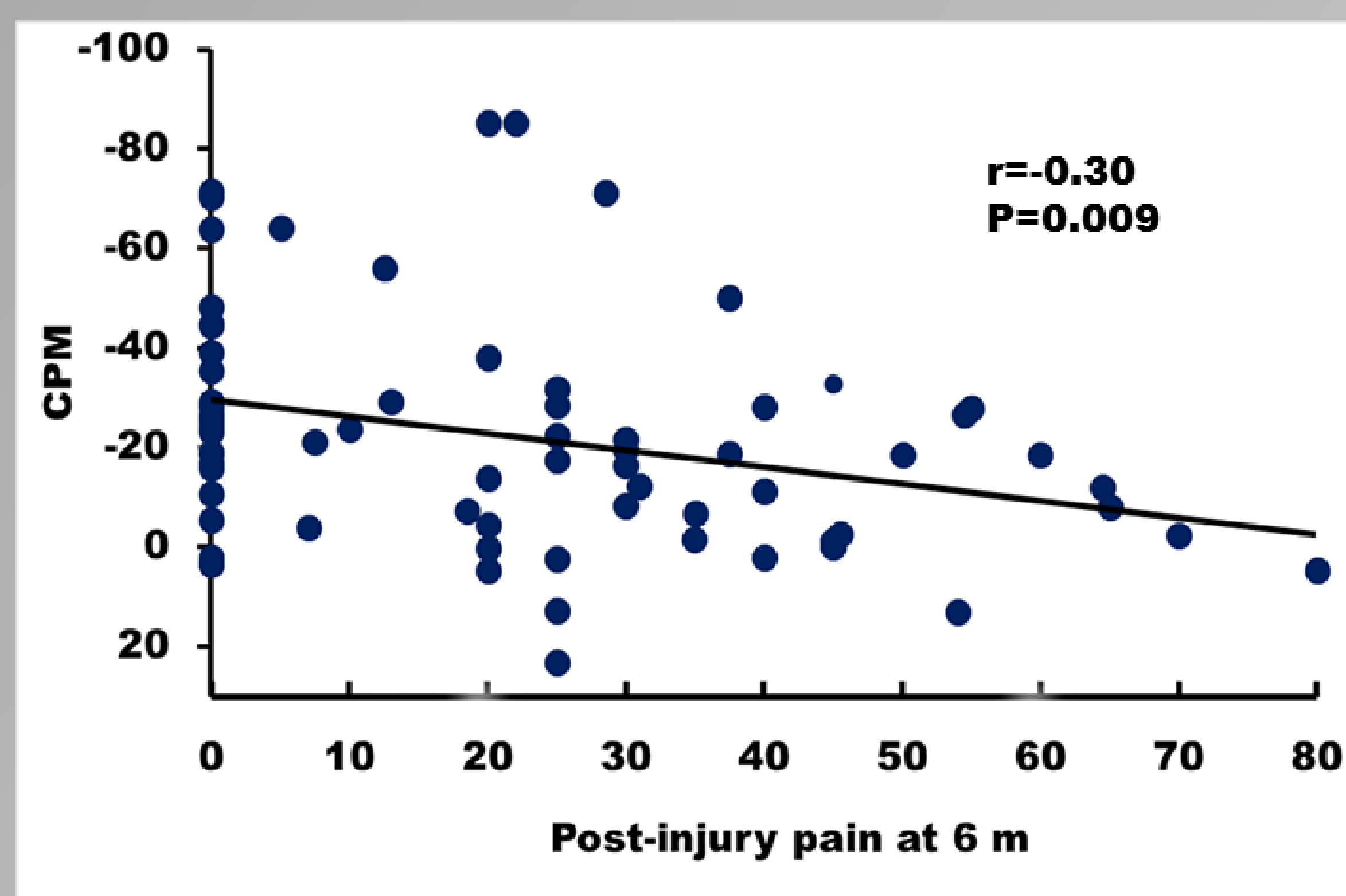
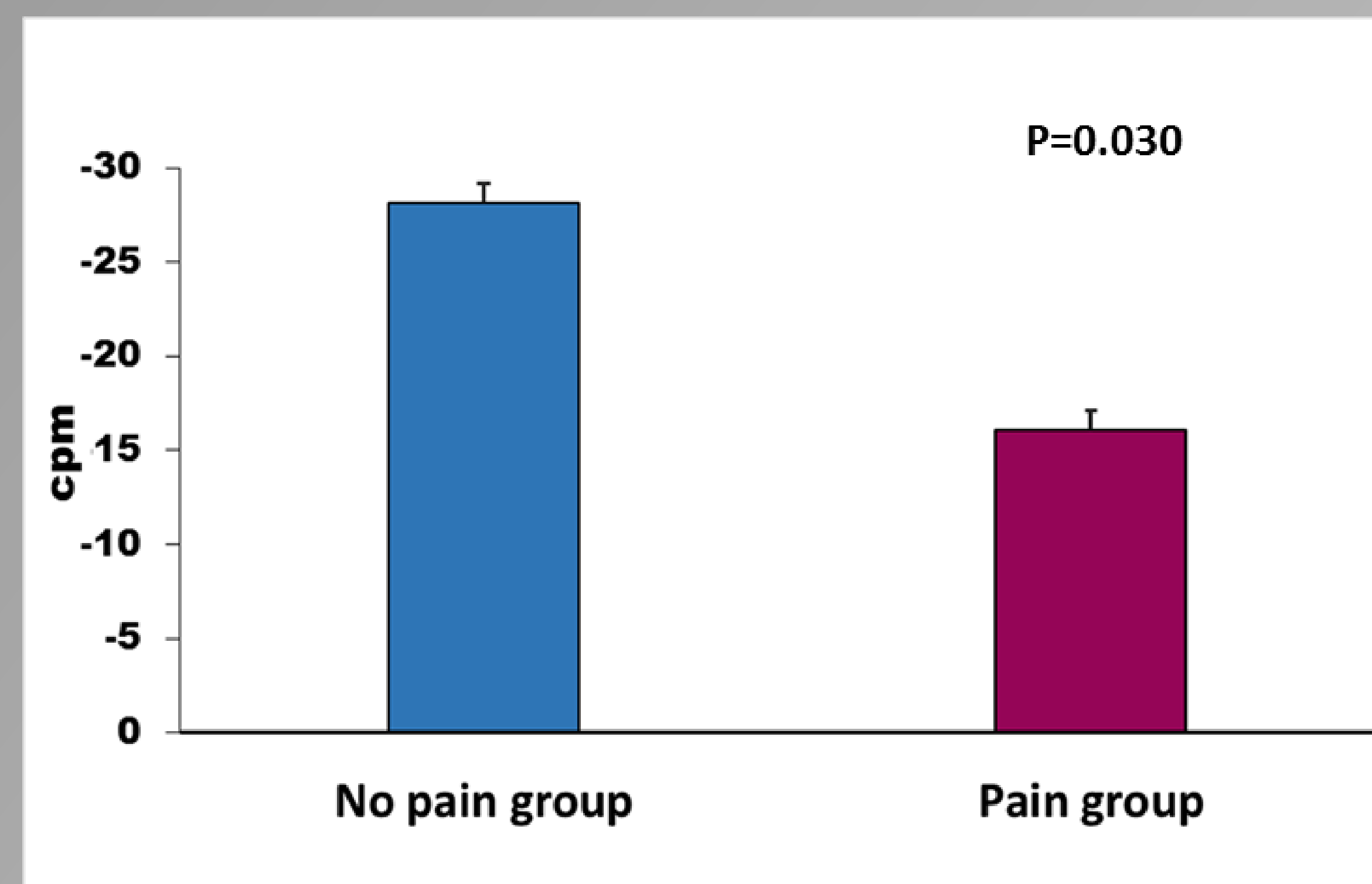


Fig 1b. Chronic pain patients demonstrated less-efficient CPM at very-early-acute post-MVC state



- Baseline conditioned test-pain scores linearly correlated with chronic mTBI pain (Fig 2a). In line, the eventual painful patient group (6m) demonstrated higher conditioned pain scores at baseline (Fig 2b).

Fig 2a. Conditioned test-pain scores positively correlate with clinical pain at 6 months post-MVC

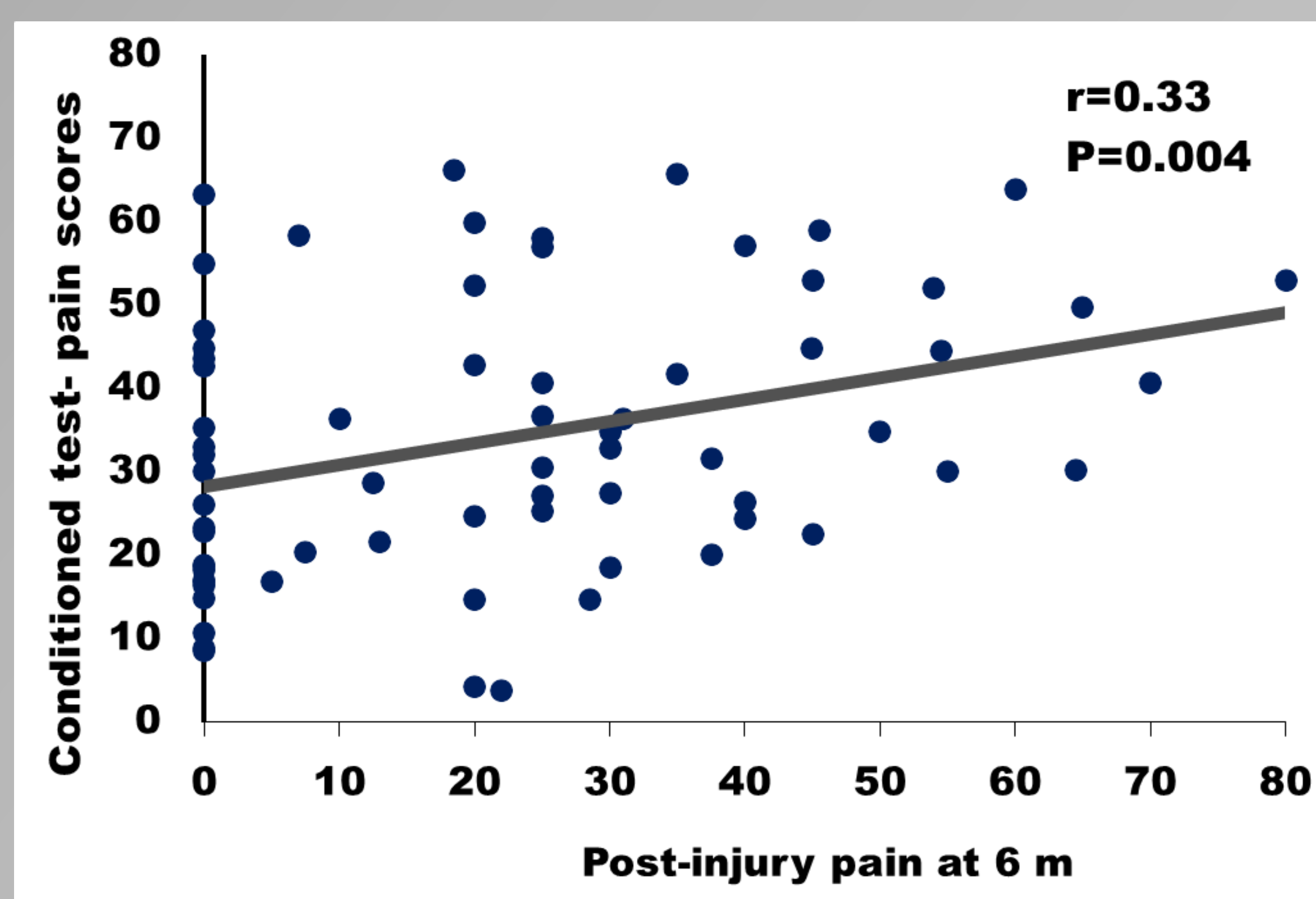
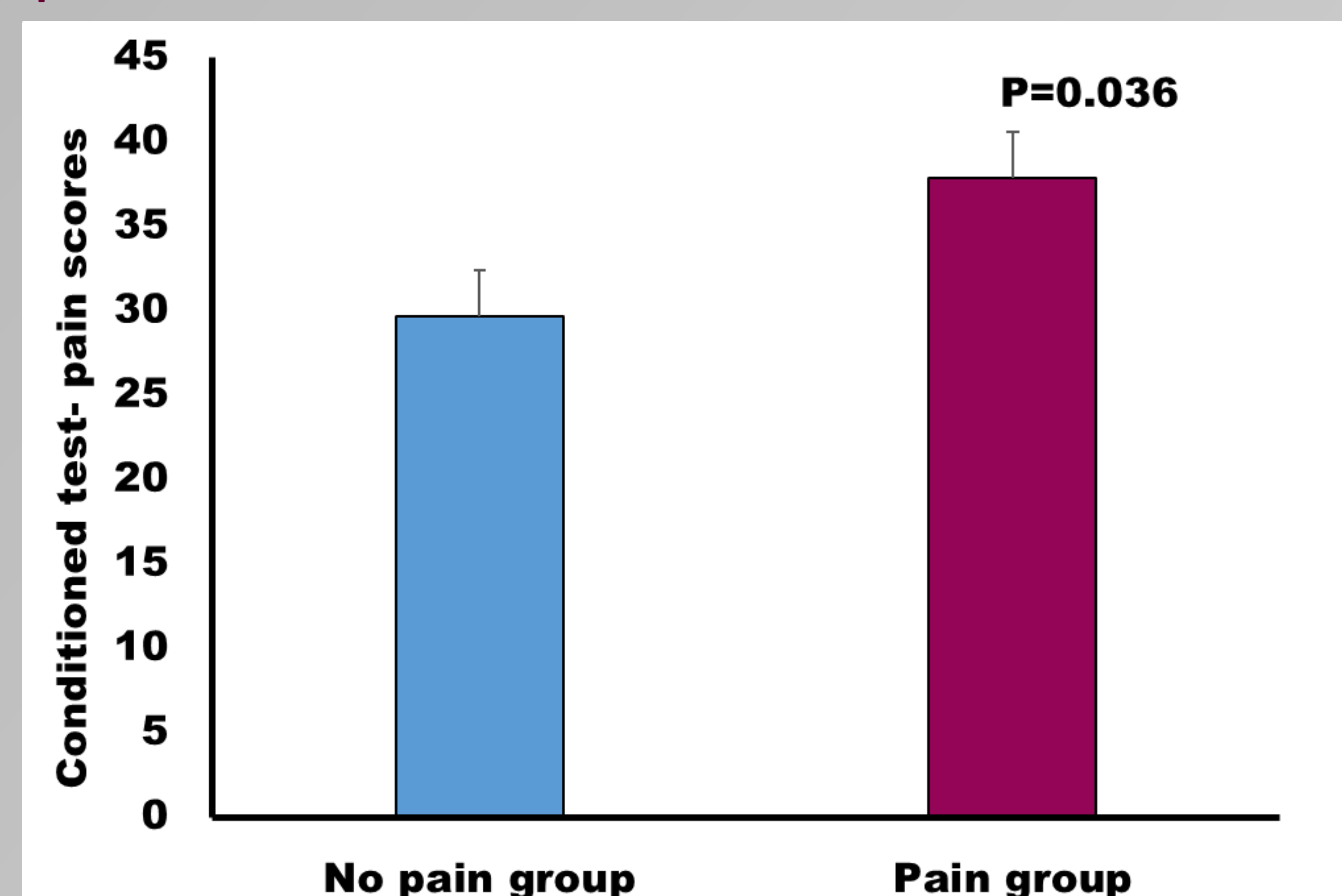


Fig 2b. Chronic pain patients demonstrated less-efficient CPM at very-early-acute post-MVC state



Conclusions

- Pro-nociceptive pattern of pain modulation predicts pain chronification post-mTBI.
- CPM efficiency in mTBI patients at very-early acute post-accident stage may be a bio-marker for therapeutic policy decisions on intensiveness of analgesic approach, possibly trying to prevent pain chronification.

Acknowledgment

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